REMARKS

Reconsideration is respectfully requested in view of the above amendments and following remarks. Claims 1 and 2 have been amended, and are respectively supported for instance, at page 9, paragraph 4 and Figures 1, 3 and at page 14, paragraph 2 and Figure 4. No new matter is added by the corrections. Claims 1-4 are pending. Claims 1-2 have been examined. Claims 3-4 have been withdrawn.

Claims 1-2 are rejected under 35 U.S.C. §102(b) as being anticipated by Ohmi et al. WO99/30809 (US 6,375,911 used as translation). Applicants traverse the rejection to the extent that it can be maintained.

Claim 1 recites subjecting an unreacted raw gas and intermediate products included in the exhaust gas to a partial decomposition or conversion reaction treatment and separating and returning the obtained halogenosilane gas and/or hydrogen chloride gas to a raw gas source for the CVD system. In the present invention, the partial decomposition or conversion reaction treatment is carried out by bringing the exhaust gas into contact with a heated transition metal. (Page 9, paragraph 4 and Figures 1 and 3.)

In a silicon epitaxial process, for example, the amount of the raw gas which actually contributes to the deposition of silicon on the substrate is about 5% and most of the remaining raw gas is exhausted without contribution from the chamber. Advantageously, the present invention solves this problem by providing a process for treating and returning an exhaust gas released from a CVD system for forming silicon epitaxial films using halogenosilane gases. The present invention, thus, treats and reuses the exhaust gas containing the remaining raw gas released from the CVD system.

The '911 patent discloses a process to treat exhaust gas from a CVD apparatus by treatment of the unreacted TCS and DCS gas with a transition metal to form hydrogen chloride and volatile silicon compounds such as silicon tetrachloride. The hydrogen chloride and volatile silicon compounds are removed by absorption in water in a detoxicating unit. No halogenosilane gas is recovered that is or can be recycled. Also, as pointed out in '911 at column 5 lines 52-53, silicon from decomposed unreacted TCS and DCS gas bonds to the transition metal catalyst.

Applicants submit that the silicide formed on the transition metal catalyst shortens the useful life of the catalyst and increases the frequency necessary for regenerating the catalyst.

The Ohmi '911 patent, however, does not teach or suggest the features of claim 1. Particularly, the '911 patent does not disclose the partial decomposition or conversion reaction treatment of the exhaust gas and returning the obtained halogenosilane gas and/or hydrogen chloride gas to a raw gas source for the CVD system. As the '911 patent does not disclose the recited features of claim 1, the '911 patent does not anticipate claim 1.

Regarding claim 2, this claim recites subjecting an unreacted raw gas and intermediate products included in the exhaust gas to a full decomposition or conversion reaction treatment, contacting the obtained hydrogen chloride gas with water and recovering the hydrochloric acid water. The decomposition or conversion reaction treatment is carried out by bringing the exhaust gas into contact with an iron reacting agent in a thermal swing condition. (Page 14, paragraph 4, and Figure 4.) The present invention provides an advantage of using an iron reacting reagent in the thermal swing condition, whereby the iron reacting agent is most suitable for decomposing and converting the unreacted raw gas and intermediate products included in the exhaust gas to hydrogen chloride.

Ohmi '911 is discussed above. The '911 patent, however, does not teach or suggest the features required by claim 2. Particularly, the '911 patent does not disclose a full decomposition or conversion reaction treatment of the exhaust gas in the thermal swing condition using an iron reacting agent. Further, the '911 patent does not disclose contacting the obtained hydrogen chloride gas with water and recovering the hydrochloric acid water. As the '911 patent does not disclose the recited features of claim 2, the '911 patent does not anticipate claim 2.

Accordingly, the '911 patent does not disclose the features required by claims 1 and 2, and would not enjoy the advantages of the claimed invention. Thus, it is respectfully submitted that claims 1 and 2 are allowable over the '911 patent. Favorable reconsideration and withdrawal of the rejection are respectfully requested.

Claims 1-2 are rejected under 35 U.S.C. §102(b) as being anticipated by Burgie et al. (US 5,401,872). Applicants traverse the rejection to the extent that it can be maintained.

Claims 1 and 2 have been discussed above.

Burgie et al. ('872) discloses a process for recovering hydrogen chloride and silanes by converting a silicon bonded hydrogen with chlorine to form a more highly chlorinated silane, primarily tetrachlorosilane (Table 1). The object of '872 is to convert hydrosilanes into higher boiling chlorosilane species thereby increasing their ease of handling and recovery (column 1 lines 54-57).

Burgie et al., however, does not teach or suggest the features recited by claims 1 and 2. Particularly, Burgie et al. does not disclose the partial decomposition or conversion reaction treatment of the exhaust gas and returning the obtained halogenosilane gas and/or hydrogen chloride gas to a raw gas source for the CVD system, as required by claim 1. In contrast to claim 2, Burgie et al. does not disclose a full decomposition or conversion reaction treatment of the exhaust gas in the thermal swing condition using an iron reacting agent. Additionally, Burgie et al. does not disclose contacting the obtained hydrogen chloride gas with water and recovering the hydrochloric acid water. Thus, Applicants respectfully submit that Burgie et al. does not anticipate claims 1 and 2.

Accordingly, Burgie et al. does not disclose the features required by claims 1 and 2, and would not enjoy the advantages of the claimed invention. Thus, it is respectfully submitted that claims 1 and 2 are allowable over Burgie et al. Favorable reconsideration and withdrawal of the rejection are respectfully requested.

In view of the above amendments and remarks, Applicants respectfully request a Notice of Allowance. If the Examiner believes a telephone conference would advance the prosecution of this application, the Examiner is invited to telephone the undersigned at the below-listed telephone number.

Respectfully submitted,

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